

REMARKS

The claims in the application are 1-30.

Favorable reconsideration of the application as amended is respectfully requested.

The present amendment is being made in accordance with a telephone interview between the Examiner in charge of the above-identified application at the Patent and Trademark Office and the undersigned attorney today. The courtesy extended by the Examiner in arranging for and conducting the telephone interview, is greatly appreciated.

Claims 31-33 has been canceled without prejudice to eliminate the rejection under 35 U.S.C. §112, first paragraph, raised in paragraph 2 of the Office Action and potential rejections under 35 U.S.C. §101 noted by the Examiner during the telephone interview while Independent Claims 1 and 22 have been amended as presented for discussion during the telephone interview and additionally in accordance with the Examiner's request. More specifically, independent Claim 1 has been additionally amended to recite means 8 for individually controlling the wheel alignment and means 18 for individually driving the wheels, while independent Claims 1 and 22 have both been additionally amended to recite position for a turning point B for the vehicle is ordered anywhere in the horizontal plane. (Reference is being made to preferred embodiments of the invention illustrated in the drawings.)

Furthermore, independent Claims 1 and 22 have each been further amended to incorporate recitation from proposed Claims 34 and 35 presented for discussion during the telephone interview. In this regard, the amendment to independent Claims 1 and 22 on rotatable arrangement of rolling point 6 of each wheel 3 finds support in Fig. 2 at and page 7, lines 20-26 of the specification and simultaneous displacement of steering line S and turning point B finds support in Fig. 9 and the description beginning at page 9, line 30 of the specification.

The remaining claims have been amended to eliminate the formal rejections under 35 U.S.C. §112, second paragraph, raised in paragraph 3 of the Office Action. Accordingly, it is respectfully submitted all amendments to the claims herein find clear support throughout the present application and drawings. For example, the "corresponding mobility" in Claim 17 refers to the wheels 3 as disclosed, e.g., at page 14, lines 16-24 of the specification (reference is being made to preferred embodiments of the present invention illustrated in the drawings of the present application). The amendment to Claim 19 automatically eliminates the antecedent basis problem in dependent Claim 21.

Therefore, the only outstanding issue is the prior art rejection of the claims. More specifically, all pending Claims 1-30 have been rejected under 35 U.S.C. §103 as obvious over U.S. Pat. No. 5,924,512 to Wada in view of U.S. Pat. No. 4,372,407 to McColl in paragraph 5 of the Office Action. However, it is respectfully submitted the

invention as recited in all pending claims herein is patentable over the applied art, for the following reasons.

The present invention improves maneuvering vehicles in tight locations, e.g., fork-lift trucks in warehouses. For example, improved maneuvering is illustrated in Figs. 7 and 8 of the present application where the inventive vehicle can be easily maneuvered into engagement with a row 21 of loading pallets without having to back up (Fig. 7 and page 13, lines 24-36). Furthermore, the inventive vehicle can be rotated through 180° while moving along a straight line (Fig. 8 and page 14, lines 1-3).

These and other advantages are explicitly attained by the present invention as recited in independent Claim 1 and which is directed to a vehicle comprising a chassis 2, and at least two wheels 3 arranged to support the chassis 2 when resting on the ground and each be rotatable relative to the chassis 2 not only about a first substantially vertical axis 4, but also about a second axis 5 at an angle greater than 0° but less than 90° relative to both the first substantially vertical axis 4 and a horizontal axis. Each wheel 3 has a contact surface against the ground defining a rolling point 6 which is horizontally displaced from the first substantially vertical axis 4. Upon one revolution of the wheel 3, a circle is traced on the ground by the respective rolling point 6.

Means 8 for individually controlling the alignment of the wheels 3 relative to the chassis 2 by turning about the first axis 4 and means 18 for individually driving the wheels 3 are also provided, along with a regulation device 9 to regulate the movements of the vehicle in a horizontal plane and a control device 7 with a calculation unit 11 to produce

signals to control the control and drive means via information from the regulation device to achieve the movement as instructed by the regulation device.

The regulation device is designed with the capability to, on request of a change of the vehicle's direction in a horizontal plane, order a position for a turning point B for the vehicle anywhere in the horizontal plane. The control device's calculation unit is designed to calculate instantaneous desired value of the wheel's angular alignment relative to a lengthwise axis of the vehicle corresponding to the location of the turning point B as ordered by the regulation device and send signals to the control means to achieve that alignment. Furthermore, the regulation device comprises first means 12, 12' for displacing a steering line S passing through the turning point B of the vehicle from one location S' to another S'' in parallel, and second means 15, 15' for simultaneously displacing turning point B along steering line S from one location B₁ to another B₂.

The features of the presently claimed invention together with the accompanying advantages attained thereby are neither disclosed nor suggested by the applied art, for the following reasons.

Both Wada and McColl fail to disclose

(1) wheels 3 also rotatable about an axis 5 at an angle of 0-90° to both the vertical 4 and horizontal axes and additionally defining tracing of a circle by rolling point 6 of each wheel 3 upon one complete rotation of wheel 3 about axis 5,

(2) ordering position of turning point B of the vehicle anywhere in the horizontal plane, and

(3) simultaneously displacing both the turning point B and steering line S.

More particularly, Wada is directed to controlling an omnidirectional vehicle to run stably at high speeds (column 3, lines 17-18 and column 9, lines 20-21) by controlling angular velocities of a driving wheel and steering shaft (column 2, lines 7-12). The various wheels 1, 21, 22, 33, 34, etc. shown in Wada are not mounted to also rotate about a vertical axis. Contrary to the assertion at the bottom of page 7 of the Office Action, Fig. 4 and column 6, line 66 – column 7, line 64 of Wada just relate to controlling movement of center of rotation of steering shaft M on which a wheel 1 is mounted along a particular trajectory K.

McColl is directed to a roadless terrain vehicle for transporting, e.g., tree trunks and which requires a specifically-structured quad wheel assembly 24, 26 pivotally connected to a main bed frame element 32 through a variety of pivot points 48, 46, etc. as shown, e.g., in Figs. 3 and 4 and described at column 4, line 61 – column 5, line 23 to maneuver under treacherous conditions; these wheel assemblies are not mounted in the manner of the claimed invention, i.e., tracing a circle by rolling point 6 of each wheel 3 contacting the ground upon one complete rotation of wheel 3 about axis 5 at an angle greater than 0° but less than 90° relative to both the vertical and horizontal axes. The McColl vehicle is directed to off-road operation and, e.g., sideways shimmying to avoid obstacles.

While certain figures, e.g., Figs. 10, 11 and 13 of McColl might show an outer turning radius, there is no disclosure of positioning a turning point B of the vehicle

anywhere in the horizontal plane, and simultaneously displacing both the turning point B and steering line S, as in the claimed invention. Accordingly, the combination of Wada and McColl fail to teach or suggest the claimed invention and accompanying advantages achieved thereby.

The remaining art of record has not been applied against the claims and will not be commented upon further at the present time.

Accordingly, in view of the forgoing amendment, accompanying remarks and telephone interview in the above-identified application, it is respectfully submitted all claims pending herein are in condition for allowance. Please contact the undersigned attorney should there be any questions. A petition for an automatic one month extension of time for response under 37 C.F.R. §1.136(a) is enclosed with the requisite petition fee.

Early favorable action is earnestly solicited.

Respectfully submitted,

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